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# Fact Sheet

## *Salmonella enteritidis*

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United States  
Department of  
AgricultureAnimal and  
Plant Health  
Inspection  
Service

## Pathogen of People and Animals

*Salmonella enteritidis* serotype enteritidis (SE), a bacterial pathogen that infects poultry and other animals and causes disease in people, has tripled in incidence in the United States in the past decade. The United States Department of Agriculture (USDA) is working to heighten awareness of SE to prevent the spread of this potentially destructive strain of salmonella in poultry.

### The Human Threat

Although they appear normal, eggs, poultry, or other foods contaminated with SE can cause human enteritis. Typically, the symptoms are diarrhea, fever, abdominal cramps, and vomiting. In the very young, the elderly, or others who are especially susceptible, salmonellosis—the disease caused by salmonella—can be serious or fatal. Once introduced, SE can rapidly become the predominant strain of salmonella. Great Britain, for example, experienced a 13-fold increase in SE between 1980 and 1989, with an estimated 500,000 human cases of SE in 1988. Most of these cases were attributed to the SE strain, known as phage-type 4. This strain is not presently in the United States, and the USDA has enacted restrictions to prevent poultry or products infected with SE phage-type 4 from entering this country.

Decreased demand for poultry products may follow poultry-linked salmonellosis cases. In Britain, the 1988 salmonellosis outbreaks resulted in an estimated permanent 20 percent loss in the egg market.

### Clinical Signs in Poultry

Clinical signs are not highly specific, but the seriousness of SE should make poultry producers especially alert. Chicks 1 to 4 weeks of age are most susceptible. The mortality rate varies but can climb to 20 percent of the population especially with SE phage-type 4, which is not present in the United States.

Stunted growth, poor weight gain, and a general lack of vigor may be signs of the disease. Death may occur without obvious signs of illness. Infected hens do not usually appear ill but can have reduced egg production.

Postmortem inspection of infected animals may show lesions in any or all internal organs including the spleen, liver, heart, and ovaries.

### How It Spreads

Evidence shows that SE can reside for months or even years in litter, soil, manure, feathers, dust, bedding, and equipment, where animals can ingest it. This disease organism may also be carried in feed or water.

Poultry can also contract SE from other infected animals. An infected bird can spread it to other members of a flock or may introduce it to a new flock. Transmission is not limited to poultry. Cattle, swine, sheep, dogs, cats, wild birds, and rodents are susceptible and could be a source of infection.

SE can be spread by infected hens to their eggs. This type of spread, termed vertical transmission, makes it especially important to detect the bacteria quickly in primary- and multiplier-breeding flocks.

### Detecting and Controlling SE in Poultry

APHIS suggests four situations where veterinary health officials should be alert, especially to the possibility of SE phage-type 4:

- Flocks displaying clinical evidence of the disease.
- Birds or eggs from imported flocks.
- Breeding flocks.
- Flocks implicated in outbreaks of human salmonellosis.

### Types of Tests

#### Screening Tests:

- Blood tests for salmonella antibodies in suspected flocks.
- Cultures of environmental samples to detect the bacteria: egg-production equipment, manure, dust, feathers, and litter.

#### Definitive Tests:

- Cultures of internal organs to detect systemic infections: liver, spleen, heart, and ovaries.

### Control

Researchers are working on vaccines for SE and on food and water additives to reduce the threat of salmonella. Currently, however, no such protection is commercially available. Where infected flocks are found, producers may only market eggs for pasteurization. Elimination of infected flocks is the best control option for SE, especially phage-type 4. The persis-

tence of the bacteria—7 months in litter or soil, 28 months in manure, and up to 5 years in hatchery fluff—necessitates thorough cleaning of a premises before repopulating.

## **Biosecurity—Disease Prevention**

A common sense way of preventing salmonella and numerous other avian diseases is through biosecurity. This is a collection of good housekeeping measures designed to keep disease organisms from entering or spreading through a poultry operation. Producers are urged to follow these practices:

- Clean and disinfect premises thoroughly between flocks.
- Clean and disinfect all vehicles and equipment entering and exiting the farm premises.
- Keep out unnecessary visitors and avoid borrowing equipment.
- Provide sanitized coveralls and boots for personnel entering poultry premises.
- Purchase replacement birds from breeders certified by the "U.S. Sanitation Monitored" Program.
- Practice "all in—all out" poultry management. Birds left behind may carry disease to incoming flocks.
- Avoid contact with game birds, migratory water fowl, and rodents—suspected carriers of poultry diseases.
- Provide only quality, salmonella-free feed.

## **Past Successes in Fighting Salmonella**

This is not the first time salmonella has threatened the egg industry. In the 1960s, cases of human salmonellosis from eggs and other sources sparked a tightening of operational procedures in the egg industry, resulting in the Egg Products Inspection Act. This Act removed substandard, non-Grade A eggs from the market and reduced human cases of salmonellosis.

SE and some other forms of salmonella cannot be eliminated by disinfecting facilities or washing the eggs, since the infection is passed by the laying hen to the inside of the egg. Additionally, some researchers believe that SE may penetrate the egg shell and migrate inside. Nevertheless, great success has been made against two types of salmonella associated with poultry and eggs. *S. pullorum* and *S. gallinarum* have been successfully eliminated in 36 states and greatly reduced in others through the National Poultry Improvement Plan (NPIP) that tests flocks to eliminate the disease from its most important source—breeding stock.

## **New Mandatory Regulations**

To control SE at the breeding stock source and to ensure that all participants in the poultry industry adhere to uniformly high biosecurity standards, the USDA has developed and put into place a program with mandatory testing, reporting, and certification requirements. This program restricts the interstate movement of hatching eggs and newly hatched chicks to those whose parent flocks are participating in either the "U.S. Sanitation Monitored" Program under the NPIP or meet the requirements of a State classification plan determined by the USDA to be equivalent. Such flocks will be called "Certified SE-Tested Free Flocks."

In addition, any flocks, either table egg-laying or breeding-type, that are implicated in human illnesses caused by SE, must be tested to determine if they are infected. Eggs from infected or test flocks can only be moved to breaking plants for pasteurization. Live chickens from infected flocks can be moved interstate only for slaughter at a federally inspected slaughtering establishment. Poultry producers are also required to obtain a permit from APHIS before moving restricted articles associated with SE interstate.

## **Shared Responsibility**

Consumers and commercial food handlers must share with USDA and other agricultural officials the responsibility of decreasing the risk of salmonella from eggs. A small number of salmonellae in a single egg can multiply and when combined with other eggs or food items can contaminate the entire mixture. The longer the mixture is allowed to stand at room temperature, the more time the salmonellae have to incubate. When using eggs in recipes, the core of the food should reach 165 degrees, the temperature at which eggs are thoroughly cooked. Recipes calling for raw eggs—mayonnaise, egg nog, ice cream, and hollandaise sauce, for example—should be made by using pasteurized eggs.

## **For more information on this program or for informational flyers on biosecurity, contact:**

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